What is claimed is:

[Claim 1] A system for controlling a set of material carriers in real time under control of a master controller comprising:

a set of at least two material carriers containing a data processing unit;
at least one master controller adapted to command said carriers to transport loads;
a set of path marking references disposed along at least one path traversed by said material carriers; in which
at least one of said master controller and said carriers contains a data processing unit for operating a real time closed loop interrupt driven position monitoring system that senses the passage of a carrier at a location.

[Claim 2] A system according to claim 1, in which a carrier senses the locations of path marking references that it passes and transmits to a controller data pertaining to its passage past such path marking references.

[Claim 3] A system according to claim 2, in which said path marking references are related to a coordinate system fixed in space.

[Claim 4] A system according to claim 1, in which said carrier senses its location in one of: a) reading markers that are part of an absolute encoder fixed in space; b) responding to signals from at least one GPS system; and c) receiving transmissions from a local source that has sensed the passage of said carrier.

[Claim 5] A system according to claim 1, in which said extended conductor comprises one of: a) a coaxial cable having RF leakage along its length sufficient to transmit to said antenna; and b) a twin-lead conductor.

[Claim 6] A system according to claim 1, in which each carrier receives a location signal from nearby carriers indicating the position of said nearby carriers and broadcasts location information indicating its own location and in which at least one carrier processes said location signal from nearby carriers indicating the position of said nearby carriers to calculate therefrom whether said at least one carrier will collide with one of said nearby carriers.

[Claim 7] A system according to claim 6, in which said controller receives said location signal from said nearby carriers indicating the position thereof and calculates therefrom whether any of said nearby carriers will collide with another one of said nearby carriers.

[Claim 8] A system according to claim 1, in which said master controller communicates with a set of zone controllers, each of which controls a set of carriers within a corresponding zone of said system, through one of: a) separate addresses for each zone and b) through separate channels in an RF spread spectrum transceiver.

[Claim 9] A system according to claim 1, in which at least one controlled location on said path is controlled by a token-passing system in which a carrier having a token is able to travel through said congested location and carriers not having said token are prevented from entering said controlled location.

[Claim 10] A system according to claim 9, in which said token is implemented through semaphore signaling.

[Claim 11] A system according to claim 1, in which the locations of said path marking references are referenced to an absolute coordinate system, whereby

said carriers are adapted to travel to a new location in said coordinate system upon command without a setup procedure to enter data in said carriers.

[Claim 12] A system according to claim 1, in which said carriers contain means for traveling in both a first direction along said path and along a second direction opposite said first direction, thereby permitting bi-directional travel.

[Claim 13]

A system according to claim 8, in which said zone further comprises at least one antenna connected to a zone controller, whereby said zone has an air interface link in addition to said link comprising an extended conductor.

[Claim 14] A system according to claim 13, in which each carrier receives a location signal from nearby carriers indicating the position of said nearby carriers and broadcasts location information indicating its own location.

[Claim 15] A system according to claim 14, in which at least one carrier processes said location signal from nearby carriers indicating the position of said nearby carriers to calculate therefrom whether said at least one carrier will collide with one of said nearby carriers.

[Claim 16] A system according to claim 14, in which said zone controller receives said location signal from said nearby carriers indicating the position thereof and calculates therefrom whether any of said nearby carriers will collide with another one of said nearby carriers.

[Claim 17] A system according to claim 8, in which an extended conductor in at least one zone comprises at least one attenuator adapted to reduce signal power transmitted from said extended conductor in an area of said at least one zone.

[Claim 18] A method of exchanging data between a set of material carriers under control of a master controller and said master controller comprising:

providing a set of at least two material carriers having a spread spectrum RF transceiver;
providing said master controller unit having a spread spectrum RF transceiver;
communicating between said controller and said set of carriers passes through a link comprising an extended conductor connected to said controller and an antenna connected to each carrier; and
processing, in each carrier, data received by said RF transceiver.

[Claim 19] A method according to claim 18, in which each carrier receives a location signal from nearby carriers indicating the position of said nearby carriers and broadcasts location information indicating its own location.

[Claim 20] A method according to claim 19, in which at least one carrier processes said location signal from nearby carriers indicating the position of said nearby carriers to calculate therefrom whether said at least one carrier will collide with one of said nearby carriers.